MAYS (T. J.)

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BY

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PROFESSOR OF DISEASES OF THE CHEST IN THE PHILADELPHIA POLYCLINIC, AND VISITING PHYSICIAN TO RUSH HOSPITAL FOR CONSUMPTION.

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ICE-COLD APPLICATIONS IN ACUTE PNEUMONIA.[1]

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WHILE cold applications in the treatment of pneumonia are by no means a new procedure, I am of the opinion that this has not yet received the consideration and extensive introduction which it merits, and in saying what I have to say to-night I trust that I am loyal to that spirit which prompts one to conservatism in the commendation of any curative measure until it has stood the test of experience; when, however, one has observed the magic changes which follow in the pneumonic condition under the beneficent influence of cold locally applied, as has been done by others as well as by myself on numerous occasions, I feel that this method has passed the experimental stage of clinical medicine, and I therefore hope that you will pardon me for appearing obtrusive when I again direct your attention to this subject.

Cold has been employed in the treatment of pneumonia for various purposes and in various

[1] Read before the Philadelphia County Medical Society, September 26, 1894.

ways. Jürgensen believes that the chief danger in this disease arises from the high fever, and which finally leads to cardiac failure. He appeals to the experiments of Zenker and others to show that high fever is detrimental to the fibers of the heart-muscle and to those of the voluntary muscles. He, therefore, recommends cold principally with a view of reducing the pyrexia. It is a question, however, whether a high temperature of itself is more fatal in pneumonia than a low one, but this is a point which will be referred to later on. So far as I know Niemeyer was the first to apply cold immediately to the chest for the purpose of reducing the activity of the local inflammatory process in the lungs.

It must be seen that these different views govern the practitioner in the mode of applying this remedy. If he believes in the constitutional nature of the disease, and especially if he thinks that the high fever endangers the integrity of the heart-muscle, his principal aim is to reduce the fever at large, and to accomplish this he immerses his patient periodically in a cold bath, which is done by Jürgensen and others. If he holds that the local trouble in the lung is responsible for the high fever, and that this constitutes the vulnerable point in the disease, he will pay less attention to the general condition and make his cold applications directly over the inflamed lung.

I believe that much of the ill-success which has followed the use of cold in pneumonia is attributable to the fact that it was employed according to the first method. The pyrexia of pneumonia is not the same as that of typhoid fever, or at least it does not

yield to cold in the same way as that of the latter does. The former is best subdued by cold being applied directly over the affected lung, as well as to the head, and general baths or spongings do not seem to be essentially indicated, and if the latter are applied they do not keep the fever down for any long period. If the fever and a great deal of the constitutional disturbance of pneumonia depends on the inflammatory process in the lung, then an abatement of the pulmonary disorder will strike at the very root of the difficulty, and it is clear too that the measure which accomplishes this must be applied continuously and persistently, and not, as in typhoid fever, at stated intervals. Moreover, it is a hazardous procedure to subject a pneumonic patient to the bodily changes and cardiac strain which are incidental to the giving of a general bath. It must be remembered that the heart is always implicated in pneumonia, and is therefore a weak and easily assailed organ.

How, then, is the cold to be applied, and how long must it be continued? The affected area must be surrounded with ice contained in bags which are wrapped in towels. If the disease is confined to the front base on one side, one good-sized bag will suffice; but if the exudation extends to the side and back, then at least one more bag must be applied laterally and as far back as possible. If the affection is extensive, put on as many ice-bags as are necessary to cover the whole area. Watch the morbid process, for it is very apt to migrate from one spot in the chest to another, and if it does so, follow it up with the ice-bag.

The length of time for which cold is to be used must, in most cases, be decided by the amount of fever which is present. If this falls to or near the normal point, and shows a tendency to remain there, then the ice may be gradually removed. It is best, however, not to be in too much haste in withdrawing the cold, for frequently before this is off very long the temperature suddenly flies up again. If this takes place, and the temperature remains high after the ice is reapplied for some time, it is a possible indication that the inflammation has invaded a new field, and is not active in the old one. This has happened several times in my experience.

It must always be borne in mind, however, that the ice is not employed solely for the purpose of reducing the fever, but rather with the object of circumventing the exudative process and of hastening resolution in the affected part. There may be very little fever present in some cases of pneumonia, as in the aged, yet the destructive changes are going on in the lungs at a rapid rate. In senile and latent pneumonia the activity with which the ice is employed must be governed entirely by the impression which is made on the pulmonary disintegration. This must be the objective point, and not the temperature.

This brings me to say something on the fever in pneumonia as a prognostic sign. Although a temperature of 105° Fahr. is generally regarded more dangerous in the adult than one of 102°, I really believe that this is an error. When the fever is excessive, as when it rises to 107° or 108°, every one

admits that this is almost necessarily fatal; but it must also be granted that a markedly low pneumonic temperature, as for example 95° or 96°, is equally fatal. The safety-point, if such there be, lies somewhere between these extremes; and within a certain range I think we can look upon this fever as an indication of the degree of vital resistance which is present in the body. If it remains between 104° or 105°, the prognosis is good, provided other conditions are equal; but if it is either very high or very low it is evidence of serious exhaustion and of vital inadequacy to cope with the destructive forces.

This opinion is partly confirmed by the high authority of Dr. Wilson Fox, when he says (*Diseases of the Lungs and Pleura*, page 352): "The extent of the pyrexia has a less unfavorable influence on the prognosis than might be expected." Out of a total of 353 cases he shows, on the same page, that the mortality from 107° to 110° was 100 per cent.; from 106° to 107°, 42.8 per cent.; from 105° to 106°, 18 per cent.; from 104° to 105°, 7.4 per cent.; from 103° to 104°, 17.6 per cent.; and under 103°, 36.9 per cent.

What, now, is the local action of cold on the pneumonic process? This, I believe, consists in its powerful influence on the pulmonary capillaries and in its ability to resolve the exudate and infiltrate. It is well known that the most apparent lesion in acute pneumonia is an enormous distention of the pulmonary capillaries, with partial or complete stasis of the blood in these vessels, exudation of fluid constituents of the blood, and proliferation

and accumulation of epithelial cells, and diapedesis of white and red blood-cells in the alveoli and bronchioles. Now, it is well known that cold has the power of contracting bloodvessels, and from this action it can be understood why it should be of benefit in pneumonia. But how it can dissolve an exudate or an infiltration is not so clear to me. That it accomplishes this I am firmly convinced. For example, there is a pneumonic area which is wholly devoid of vesicular sounds, and has a flat percussion note and bronchial breathing, indicating beyond doubt that the process has passed beyond the stage of engorgement and into that of exudation or of infiltration, yet the application of ice to this spot will in a remarkably short time develop a new group of physical signs, such as crepitation, reappearance of the vesicular murmur, diminution of flatness, etc. This has not only been observed by myself over and over again, but is also dwelt on by Dr. Lees, who had an extensive experience in the use of ice in this disease, when he says (*Lancet*, November 9, 1889, page 894): "In many cases I noticed a striking arrest in the development of the physical signs," and that the ice-bag "distinctly tends to repress the inflammatory process in the lung."

Is the ice-treatment applicable in croupous or in acute catarrhal pneumonia, or in both forms of the disease? In my earlier experience I inclined to believe that it was only adapted to the treatment of the croupous variety, but further familiarity with the measure taught me its use in the acute catarrhal form. I have also given it a trial in chronic bron-

cho-pneumonia and in pulmonary phthisis, but with rather indifferent results, if not with positive harm in some cases. I must admit, however, that in several cases of this kind it seemed to do exceedingly well. It must be borne in mind, too, that the ice-bag is strongly recommended by the late Dr. Brehmer, and by Dr. Detwiler and others, in the treatment of chronic lung trouble, and with such excellent testimony in its favor it is very probable that many of us do not yet understand the specific indications for its use.

Besides being useful in croupous pneumonia, and in acute catarrhal pneumonia, it also has excellent effects in the capillary bronchitis of infants, and in the catarrhal pneumonia which follows measles, diphtheria, and scarlet-fever.

It is also desirable in this connection to say something regarding the heart in this disease. From the tenor of much that is said and written on pneumonia at the present time, one receives the impression that more is to be feared from cardiac than from pulmonary failure. That the heart's function is impaired no one will, I think, deny. Indeed, this could not be otherwise, for the heart and lungs have a common nerve-supply, are bound closely together by the pulmonary blood-current, and whatever invalidates one must also affect the other ; but I believe that the doctrine that pneumonia becomes fatal because the heart is unequal to the work of forcing the blood through the engorged lungs, and all that we are required to do is to stimulate and to goad this organ, unmindful of what is going on in the lungs, is as imaginary in its conception as it is fatal in its practice.

The pulmonary circulation is undoubtedly obstructed, and there is no question but that the heart chafes, frets, and becomes seriously embarrassed. Dr. Wilson Fox (op. cit., page 285) says: "One of the most important consequences of pneumonia on the circulation is the occasional occurrence of thrombosis in the pulmonary vessels leading to the affected part. This event, caused in all probability by the retarded circulation in the lung, is not uncommon, and may, by extending to the larger branches of the pulmonary artery, be a source of immediate danger from sudden death, and may also in great probability retard the process of resolution and the subsequent convalescence." But is this any reason why we should whip up this organ in the hope that it may perform an impossible task, and stand by and do nothing to alleviate the blockade in front? Is this sound sense or physiologic reasoning? No. We must discard this cart-before-the-horse theory, and make strenuous efforts to remove the difficulty in the lung, and in this way liberate the heart from its entangled situation. To accomplish this very end there is no agent more efficacious than ice; and besides removing the engorgement and even the exudation in the affected lung, it also acts as a powerful stimulant to the heart's function. Indeed it is chiefly for its serviceable influence on the heart that the ice-bag is recommended in chronic lung-diseases by Dr. Brehmer and others.

In conclusion, I beg to say that the external application of cold in typhoid fever has reduced the death-rate from this disease to almost nothing, and

I am sure it is not too much to presume that the same remedy, although differently applied, will do the same in the case of pneumonia. My opinion is based on what I have seen in my own practice and in that of others. In my collective report of fifty cases from various sources (see MEDICAL NEWS, June 24, 1893) there were two deaths. Since the publication of this list I have received abstracts of seventeen other cases treated by Dr. Jackson, of Brockville, Ontario, and have myself collected seven cases without a death, neither the histories of which, nor those of Dr. Jackson, had I time to write out since receiving the kind invitation from your Board of Directors to prepare a paper for this evening—making in all seventy-four cases of pneumonia treated with cold applications, and two deaths; or a death-rate of 2.70 per cent.

Now, the death-rate from pneumonia when treated according to current methods is variously estimated from 20 to 30 per cent., hence the results from the cold-water treatment are at least ten times better than those which are obtained by other methods.[1]

[1] In addition to the ice, most of the patients received quinin, a mixture of ammonium acetate, strychnin, digitalis, morphin occasionally, a nutritious diet, etc.